

NATURE OF CHOLERA

INVESTIGATED.

BY

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“It is only when we are wandering and lost in the mazes of particulars, or entangled in fruitless attempts to work our way downwards in the thorny paths of applications, to which our reasoning powers are incompetent, that nature appears complicated:—the moment we contemplate it as it is, and attain a position from which we can take a commanding view, though but of a small part of its plan, we never fail to recognize that sublime simplicity on which the mind rests satisfied it has attained the truth.”—SIR J. HERSCHEL.

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AND OF THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF LONDON
WITH A PREFACE BY J. G. KENNEDY

It is a well-known fact that the disease of Cholera is a very dangerous one, and that it is often fatal. The disease is caused by a virus which is present in the water of the river Ganges, and which is carried to other parts of the world by the ships which trade with India. The disease is characterized by a sudden attack of vomiting and diarrhoea, and by a rapid loss of fluid from the body. The disease is often fatal, and it is one of the most dangerous of all the diseases which are known to man.

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ERRATA.

Page 12, line 12, for "established doctrines he allows," read "he allows established doctrines."

Page 26, line 13, for "Majendie," read "Magendie."

Page 47, line 25, for "alœæ," read "alæ."

THE
NATURE OF CHOLERA
INVESTIGATED.

In 1832, the author published the following view of the Nature of Cholera*.

“That the alimentary canal becomes subjected to a process which altogether supersedes digestion, and, by this process a large quantity of fluid is produced as an excretion, which rapidly diminishes the bulk of the blood; with the mechanism of this production we are as yet unacquainted.

“That this constitutes the disease.

“That in some instances the disease continues its progress till the death of the patient; but, in the very large majority of cases when left to nature, the

* Letter to the Board of Health. London, *Rivington*; 1832.

disease ceases when it has produced a state of collapse, varying in intensity.

“That this state of collapse is remarkable in the phenomenon, that the patient himself complains of heat felt throughout his body, while to the by-stander he appears to be perfectly cold.

“That extreme thirst attends this state of collapse.

“That though fluids requiring digestion are rejected by the stomach, and therefore with difficulty find their way into the system,—cold water, which is most grateful to the patient, becomes gradually received and retained.

“That the blood, in consequence of a change in its constituent principles, by which it becomes more viscid, is thereby rendered less easy of circulation.

“That though the evacuations of the morbid excretion cease, retching continues, which assists, mechanically, the passage of the blood, and produces a general relaxation of the system; hence diminishing the obstacles to the circulation of this fluid.

“That when the system becomes replenished with fluid to a certain extent, and the circulation of the blood thus acquires a certain degree of energy, the gall duct, which remained closed during the progress of the disorder, now permits the flow of the bile. The bile, generally in a vitiated state becomes ejected by vomiting, (this action still assisting the circula-

tion) a further flow of bile then gradually prepares the alimentary canal for a renewal of its proper functions.

“That though no specific fever follows the disease, the shock thus given to the system, commonly produces the most severe effects in the form of local inflammations and congestions in the various viscera.”

It is remarkable that on the very day on which this was published, the memorial of Dr. Hardwick Shute addressed to the Board of Health, appeared also in the weekly Medical Journals. Dr. Shute's paper strongly confirmed the truth of this view; but the well known fact that Cholera has proved fatal before the alimentary canal had become affected, led the author of this enquiry to further and stricter investigation.

His aim, in the following pages, is to prove that the disease essentially consists in paralysis of the heart;—and to shew that the consequent symptoms constitute the means by which Nature attempts to remedy the evil, analogous to the remedial means she employs in repairing any mechanical injury to the animal frame.

The plan adopted is to shew,—first, the analogy of Cholera with other diseases;—then, to explain its own peculiar nature;—and lastly, to lay down principles of treatment, which can alone be derived from an accurate knowledge of the nature of the disease.

PROPOSITIONS.

1.—That Cholera depends on a deleterious influence exerted on the system; in this respect resembling many diseases, as small-pox, and others.

2.—That the deleterious impression once made on the system, death may be immediately occasioned, either by its violence, or by its peculiar effect on the idiosyncrasy of the person attacked;—but that generally, a new and salutary process is established by nature for resisting its effects.

3.—That the manner in which nature effects a change of conditions necessary for the safety of the patient, is, that of putting into requisition the extensive surface of the alimentary canal for the exudation of a large quantity of fluid, thus rapidly diminishing the bulk of the blood, and effecting other changes in its nature, required by the necessity of the case.

4.—That any further phenomena remarkable in this disease, are either effects of this salutary process, or accidents not necessarily connected with it.

PROP. 1.—That Cholera depends on a deleterious influence exerted on the system, in this respect resembling many diseases, as small-pox, and others.

We may assume it as an axiom that a deleterious influence is exerted on the system in an attack of Cholera; and the cause or nature of this influence has afforded to writers on the subject, a wide field for speculation. Some accredited authors refer the proximate cause of Cholera to certain electrical conditions:—but as it would be idle to refer to all the hypotheses which have been entertained on the subject, it is sufficient to remark that the one which ascribes the cause of Cholera to a *poison*, seems to afford the most rational idea of the nature of the disease; let us see how far it be tenable.

All that can be accomplished towards establishing the fact of a poison producing the disease (as it cannot be demonstrated) is to shew the extreme probability of it.

The first argument, then, in favour of this idea is, that the mode in which the disease occurs in its most vehement form, that of instant death, admits of explanation in no other way.

The second argument is afforded by the analogy of other *epidemics*, as the exanthemata, typhus, plague, &c.

which are generally admitted to depend on poison contained in the atmosphere.

In order to support the first argument the following quotations may not be deemed unnecessary.

“Several instances were heard of at Hoobly,* and other places, of natives being attacked with the disease whilst walking in the open air; and having fallen down, retched a little, and complaining of vertigo, blindness, and deafness, they expired in a few minutes. Mr. Gordon reports to the Medical Board of Bombay, several cases precisely similar. At Bellary, a native tailor was attacked, as was believed, by this disease (for it was during its prevalence) and instantly expired, as it is said, with his work in his hands, and in the very attitude in which he sat, when it came on.” Captain Sykes, in a letter published in the work above alluded to, states that “when the disease first commenced its ravages at Punderpoor, three hundred and fifty people are described to have died in one day, tumbling over each other lifeless in the public streets.” Mr. Coates on the same occasion observes, “the number of deaths at Punderpoor in a few days were estimated at three thousand; and the patients are described as having been knocked down dead as if by lightning.”

* Orton on Cholera, page 8.

Bell also says * “a man in high health and spirits accompanies his companions to bathe ; he is seized while in the water with vomiting and purging, or with spasm, is brought immediately to a surgeon, and is found in what I have called the second stage of the disease.

“Or a man goes to bed perfectly well, and is roused at three o'clock with a call to stool, animal heat has already failed, and in three hours he is dying.”

In all phenomena affecting animals, the nervous system is so largely concerned, that it can never for a moment be absent from our minds ; when no evident lesion of other tissues exists, even those who most diligently enquire into the nature of organic lesion, at once refer to the nervous system for an explanation of phenomena which may present themselves, well knowing that mysterious influences are exerted on this tissue, though in a manner beyond the reach of our present means of investigation.

If then we admit that a poison is the agent in the production of Cholera, let us for the present be content to refer its action, in the most general way, to the nervous system, carefully avoiding fallacies in endeavouring to fix its seat more clearly than we are able.

* Bell on Cholera, page 19.

Thus Mason Good is assuming too much when speaking of exanthemata,* he says, "all concur in evincing the existence of morbid and specific *poisons in the blood*, acting the part of animal ferments, converting the different fluids into their own nature, exciting the commotion of fever and being eliminated on the surface as the best and most salutary outlet to which they can be carried, by the very fever which they thus excite."

Now that poisons exist in the blood, in these diseases, is by no means proved ; and though the argument that the contents of the pustule of small-pox, (an immediate production from the blood,) can reproduce the disease in others, is a good one, yet it is by no means conclusive.

All that we know for certain, is, that a poisonous influence is exerted on the system, giving rise to a series of phenomena, among others the production of a specific pustule, and that the pus therein contained, will reproduce the same phenomena by inoculation. We cannot too strictly guard ourselves against implicitly receiving doctrines, which however ingenious, may render fallacies liable to pass for undeniable truths. Thus the doctrine laid down by Mason Good respecting exanthemata, was admitted by the humoral pathologists, and they consistently acted upon it

* Vol. iii. p. ii.

by stimulating their patients with the view of throwing off the virus.

PROP. 2.—That the deleterious impression once made on the system, may produce death immediately, either by its violence, or by its effect on the idiosyncrasy of the person attacked; but that generally a new and salutary process is established by nature for resisting its effects.

If we are sufficiently satisfied that the cause of the disease is the existence of a poison, then the questions naturally arise—what is the nature of the poison;—and what is the mode of its operation on the nervous system?

The chemical nature of all epidemic poisons whatever has hitherto escaped the detection of the most accomplished chemists; but the nature of the Choleric poison being entirely unknown, let us the more closely watch its effects.

The poison of epidemics differs from other poisons in the very uncertain operation of its action on individuals exposed to its influence; a certain portion of the population only is affected by it at all, while those who do become affected, experience its attack in such various degrees of intensity, as can be explained

only on the principle of idiosyncrasy, so many examples of which, we witness in the effects of ordinary articles of diet.

All poisons remarkable for the *rapidity* of their effects exert their influence on the brain, or on the heart. In Cholera, every one is struck with the normal condition of the brain, while the severe affection of the circulation is no less obvious. To the heart, therefore, we must refer the action of the poison producing Cholera.

How then does this poison affect the heart?

Two phenomena attend the lesion of the circulation:—pulsation is diminished, and there is a change in the condition of the blood itself. This alteration depends principally on the colour being darker, the consistence thicker, with less power of coagulation than in the natural state. Every one, who practices venesection, knows that there is a correspondence between the pulsation of the vascular system, and the appearance of the blood when extracted.

When the pulsation is extremely forcible, venous blood often assumes a tint nearly approaching to the arterial hue; possessing the power of coagulating firmly, and therefore, exhibiting a small mass of crassamentum with a large quantity of serum.

It is equally well known that the fluidity of the

blood in this condition is also increased. In Cholera, then, the opposite condition to this obtains in proportion to the diminished action of the heart.

Magendie concluded from experiments on Cholera patients, that the change in the blood is, simply that the entire mass of the blood is rendered venous in consequence of the failure of the heart's action; that the elasticity of the arteries enable them to propel their contents into the veins, but that the *vis a tergo* in these vessels is not sufficient to carry on the circulation:—stagnation of the blood in the veins results; from this he inferred the altered condition of the blood, and the blue colour of the patient.

But Magendie afterwards found that arteries contained black blood, though not so black as that contained in the veins; that this blood is rendered red by *long* exposure to atmospheric air, but even then not so red as healthy blood; and that there was a remarkable alteration in its constituent principles: he also found that there was no abnormal alteration in the respired breath of the Cholera patient.

From these data, Magendie concluded that it is now proved fallacious that the brain requires arterial blood for its proper discharge of function, and that arteries cannot secrete from venous blood.

Now the alteration in the constituent principles of the blood taken from Cholera patients in the state of

collapse, according to Dr. Thomson of Glasgow, is as follows.

	Healthy Blood.	Cholera Blood.	
		Specimen 1	Specimen 2
Water	100	100	100
Albumen	10.79	7.34	9.21
Fibrin	5.67	0.57	1.97
Colouring matter with albumen	9.42	41.51	34.8
Salts	1.65	1.81	1.85

The physiologist will arrest his judgment before established doctrines he allows to become unsettled in his mind, when he observes, that there is a great alteration effected in the constituent principles of the blood; that fibrin is considerably diminished in Cholera; that the colouring matter is greatly increased; that as the respired breath is normal, carbon at least is thrown off by the lungs: he will rather infer, that though in the natural state of the blood, that which has the venous character cannot usurp the place of the arterial, without fatal effects, yet that such changes may be effected in the condition of the blood, as to render life and organic function compatible with a dark hue of this fluid.

When animals are *rapidly* destroyed by tobacco, by the Upas Antiar, or by arsenic, death appears to result simply from their action in paralysing the heart;*

* Christison on Poisons, p. 18.

“ the aörtal cavities being distended with florid blood and the heart itself being insensible to the stimulus of galvanism, while the voluntary muscles are as irritable as after other kinds of death.”

Instances of sudden death from Cholera, as in the cases quoted of the tailor at Bellary, &c. have not been known in this country ; nor in these cases have the appearances of the blood in the aörtal cavities immediately after death been recorded, or the possibility of death from Cholera, without change in the appearance of the blood, might have been ascertained.

It must be observed, that no chemical change takes place in the blood till the choleric discharges have occurred ; and that the action of the vascular system seems to influence the condition of the blood ; and from these premises we have strong reason to infer that the lesion of the circulation consists essentially in the diminished action of the heart ; for the alteration in the state of the blood depends, in all probability, on a salutary process for resisting the effects of this condition of the heart.

Thus then we have endeavoured to shew that Cholera is produced by a poison, the specific effect of which is to paralyse the heart.

If paralysis of the heart therefore be the disease, and if the removal of the cause be out of our power, what is the most consistent physiological treatment ?

In acute paralysis, besides depletion, the most necessary of all things is the repose of the affected organ, and all therapeutical means which tend to this end are salutary. The heart, however, is an organ, the perfect repose of which is incompatible with life, yet the condition nearest to a state of repose, must be the most favourable for its recovery.

Two indications would seem to be clearly pointed out to effect this object.

1. To diminish the circulating fluid.
2. To effect such a change in the condition of the blood; as would be most compatible with the repose of the heart.

PROP. 3.—That the manner in which nature effects a change of circumstances, necessary for the safety of the patient, is, that of putting into requisition the extensive surface of the alimentary canal for the exudation of a large quantity of fluid, thus rapidly diminishing the bulk of the blood, and effecting other changes in its nature required by the necessity of the case.

We have said, the first object for the relief of the patient is the diminution of the circulating fluid. How is this to be accomplished by nature?

The Indian writers and practitioners who maintained such various opinions respecting the nature and treatment of this disease, agree at least, almost universally, on this point, that bleeding is beneficial, and that a very large quantity of blood should be abstracted in order to derive advantage from this operation.*

Under circumstances of vascular excitement, nature commonly has recourse to hæmorrhage for the patient's relief; but under the opposite condition, this is rendered impossible, though an artificial hæmorrhage is sometimes at least highly useful.

In Cholera, therefore, nature subjects the alimentary canal to a process by which a large quantity of fluid is excreted, and thereby the bulk of the blood is diminished. What is the mechanism of this action?

Nothing is more striking than the sympathy which exists between the different organs for their mutual benefit. The loss of appetite where sanguification would be prejudicial;—the excitement of the vascular system when lesion of structure requires reparation;—the relief afforded the brain by the action of the skin as in some exanthemata, are too familiar to require comment: it is difficult to conceive any other principle on which the discharges in Cholera can be

* Orton, p. 306. Bell, p. 140.

accounted for. A *secretion* appears to take place at the nearest point to the centre of circulation at which this can be effected ;—the extensive surface of the alimentary canal affords a convenient secreting organ and, also, a receptacle for the fluid, which it is requisite should be thrown off from the system. It is highly probable, then, that the capillary vessels of the alimentary canal are stimulated to the process of secretion by the physiological condition of the system, and, in thus viewing the subject, we do but recognise the same law operating, which causes the secretion of adhesive matter to remedy the effects of an incised wound ; and which HUNTER, unable to explain, called the “stimulus of necessity.”

We next have to consider, how such a change in the condition of the blood might be effected, as would be most compatible with the repose of the heart.

In order to produce a robust condition of the frame, we adopt such diet as shall increase the fibrin of the blood. Under inflammatory action this principle is increased : it is this condition which accompanies, if it may not on some occasions produce, vascular excitement. The absence of this principle, therefore, is necessarily the most favourable for vascular quietude, and consequently for the repose of the heart. The fibrin, accordingly, we actually find thrown off from the blood in considerable quantity, by the excretion of Cholera, and thus both the diminution of

the bulk of the blood, and the necessary alteration in its nature are at once effected by that which is assumed to be the salutary process established by nature for resisting the effects of the poison of Cholera.

The reasons for believing this affection of the bowels to be salutary are these :

1st. It has already been shewn that Cholera in its most intense form, produces death instantly without discharges : all those who recover from its attack experience the peculiar discharges more or less.

2ndly. The analogy of the exanthemata, in which the extensive surface of the skin is put in requisition for the purpose of relieving some internal organ, as the brain in small-pox and scarlet fever, the lungs in measles, &c.

3rdly. The arguments just adduced as reasons why the blood should be diminished in quantity and altered in quality.

4thly. The ultimate recovery of persons who have continued in a state of collapse for a considerable length of time, often extending to a period of three days, and who in all instances sustained enormous discharges.

In the physiological arrangements of nature, the wisdom of anticipation and prevention is every where observable. He who has witnessed the dreadful dis-

turbance of the function of the brain, previous to the eruption of small-pox, and the immediate relief afforded this organ by its appearance, is convinced of the salutary nature of its operation ; yet in ordinary cases the eruption takes place before any severe cerebral symptoms are manifested : the eruption will even take place if the case be so mild that the patient does not lose his appetite, and is able to continue his ordinary avocations. The salutary eruption being ordained, it supervenes according to the emergency of the case : so it is with Cholera, the heart, in danger of being overpowered, is relieved by a salutary process peculiar to this disease. With respect to the ultimate recovery of persons, who, for a period of three days, continue in a state of collapse, in which the pulse is generally imperceptible, and when perceptible amounts only to a mere flutter, we have reason for believing that under no other circumstances than that of this peculiar alteration of the blood could the patient continue to exist without more active circulation for so long a time ; and that therefore this alteration is salutary, and the process by which it is occasioned.

PROP. 4.—That any further phenomena remarkable in this disease, are either effects of this salutary process, or accidents not necessarily connected with it.

PATHOLOGY OF CHOLERA.

ENUMERATION OF SYMPTOMS.— Vomiting,— diarrhoea,—suppression of the bile, and of the urine,—cramps,—emaciation,—intense thirst,—pulse diminished or abolished,—alteration of the voice,—alteration of the colour of the skin,—alteration of the appearance of the blood when abstracted,—extreme coldness of the surface to the touch of another,—coldness of the tongue and breath,—sensation of heat felt throughout the body by the patient,—jactitation,—cold, clammy sweat,—mind entire,—pain in the epigastric region,—in the region of the heart,—and often in the situation of the transverse arch of the colon,—oppressed respiration,—peculiar smell,—coma.

Morbid appearances in those who die in the state of collapse.

HEAD.—Vessels injected with darker blood than natural—brain dryer and firmer than natural.

THORAX.—Pleura and pericardium healthy, but dryer than natural. Lungs sometimes gorged with black blood, sometimes extremely collapsed. Heart flabby—sometimes ecchymosed ; * both sides distended with black blood:—large vessels similarly distended with the same fluid.

* Fergus on the Cholera at Vienna.—*Lancet*, 23rd June, 1832.

ABDOMEN.—Peritoneum healthy, but that which invests the stomach and bowels often more or less congested. Liver generally healthy; sometimes partakes of the general abdominal congestion:—gall-bladder distended, sometimes with healthy, sometimes with vitiated bile;—ducts pervious. Stomach and intestines gorged with blood;—the canal contains in considerable quantity the fluid so commonly compared to gruel, soapy water, or rice-water, which constitutes the peculiar discharges:—mucous follicles enlarged;—whitish, opake, viscid substance adherent to the mucous membrane;—mucous membrane softened. Urinary bladder contracted.

CHEMICAL PATHOLOGY.—The analysis of Cholera blood by Dr. Thomson has already been quoted: that of the dejections is said by other chemists to be composed of water, fibrin with albumen, mucus, carbonate, acetate, muriate, phosphate, and sulphate of soda.

Dr. O'Shaughnessy disputes the accuracy of Dr. Thomson's analysis respecting the deficiency of fibrin in Cholera blood, but he admits that the flaky matter contained in the dejections is principally composed of fibrin.

It has been attempted to establish the fact, that the *vomiting* and *diarrhœa* constitute the salutary process by which the fatal effects of the poison producing the disease is to be remedied ; and if this be true, then it is evident that, so far from digestion being a function necessary to a person affected with Cholera, the digestive canal is in requisition for a purpose of a directly opposite tendency ;—that instead of elaborating fibrin for the supply of the blood, it is engaged in throwing off this substance from the blood ;—the bile can be of no service in this process, and nothing in the economy of nature is uselessly performed ; *bile is not, therefore, now secreted* ;—the gall-bladder generally full, does not pour forth its contents to be wasted ; but the duct remains closed during the progress of the disorder, until, indeed, it can again be usefully employed in the animal economy. As to the mode in which the duct is closed, the conjecture may be hazarded, either that there requires to be a peculiar condition of the intestine to induce its flux ; or that bile being no longer secreted, there no longer exists a *vis a tergo* from the actively continued distension of the gall-bladder, which may be another condition necessary for its flowing. The accident of the bile actually flowing into the stomach and intestines, has actually once fallen under the writer's observation ; during the progress of the peculiar Choleric discharges, in a woman forty-two years of age, of a very

debilitated habit of body, in whom the symptoms, though highly characteristic, did not occur with very great violence. The gall-bladder appeared on this occasion to have emptied itself fortuitously of healthy bile, which it contained; for a moment this circumstance deceived the mind as to the course the disease was taking, but attentive observation immediately annihilated the expectation which was raised;—the evacuations quickly resumed the Choleric appearance, and the patient died in the state of collapse. The supposition of spasm of the bile duct, which some have conjectured to be the cause of the suppression or retention of the bile, is not supported by any fact.

The connection which exists between the discharges from the skin, the kidneys, and the bowels is well known. In winter the urine is increased in quantity, in proportion to the diminution of perspiration. If the perspiration be much increased, the bowels are commonly rendered costive, as well as that the urine is diminished in quantity. If then we consider how rapidly the Choleric fluid is carried off from the blood, and that this fluid contains the very saline substances which are naturally thrown off by the kidneys, we perceive that *their function is anticipated, and their office for the present unnecessary.**

* Christison (on Poisons, p. 746,) quotes a case of poisoning by *digitalis*, in which there was *suppression of the urine for three days*.

The obscurity in which the nervous function is involved, renders it difficult to account satisfactorily for the painful *cramps* with which the patient is harassed. The circulation is so severely affected, and the muscles themselves are so emaciated from the rapid absorption of fluid in this disease, that it is not surprising that cramps should occur; we witness continually the occurrence of this phenomenon from much slighter ostensible causes, and the circumstance of the spasms taking place most frequently in the extremities, where the circulation is most feeble; and where the alteration in appearance is most remarkable, gives us a double argument in support of the assumption that these phenomena constitute the cause of cramps.

There can be no doubt of the *thirst* being a powerful suggestion on the part of nature, for the necessity of replenishing the system with fluids as quickly as it is in a condition to receive it.

The *alteration of the voice* would appear to depend on the peculiar condition of the lungs;—respiration is imperfectly performed, for the circulation in the lungs being impeded no vigorous intonation can result from the process.

Among the other symptoms enumerated in poisoning with this substance, are *profuse watery purging, incessant retching and vomiting, sense of heat throughout the body, almost complete stoppage of the pulse, cold sweats.*

Of the mode in which animal heat is produced, we are not yet sufficiently informed; but there is no doubt that the circulation is concerned in this process, although the ingenious theory of Dr. Crawford is untenable: the *absence of the evolution of heat* seems fairly attributable to the failure of the circulation, while the vital process going on within accounts for the *sensation of heat which is felt by the patient throughout the body*.

If we carefully observe the mode in which the nervous function is performed, during the progress of the disease, we do not find that those abnormal conditions, assumed by some writers, have any real existence. Thus the paralysis of the sympathetic or ganglionic system of nerves of Bell, is denied by the fact of the secretion of the milk and of the menstrual fluid. The lesion of the eighth pair of nerves, conjectured by Dr. Thomson, is not affirmed by the condition of respiration.

The *jactitation and clammy sweat* are symptoms which close the scene in many diseases. Though the *mind is strikingly free from the slightest aberration* in Cholera, as a general rule, yet, shortly before a fatal termination, some delirium will occasionally take place; and the most trifling occurrence of this symptom must ever be regarded as having the most unfavourable tendency: so seldom does the brain recover

itself when once its function has been disturbed in this disease; and the same remark applies to the congestive inflammation or fever, which may form the sequela to this complaint. The Choleric discharge, a process so new and sudden, must occasionally give rise to intense congestion, and consequently *to pain, in the epigastric region*; but that which is often experienced in the situation of the *transverse arch of the colon*, we have been led to think exists only as sympathetic with the heart itself; for we have often witnessed this symptom in cases unconnected with Cholera, where, on post mortem examination, no other lesion has been discovered, than morbid changes in the structure of the heart.

The *oppression of the respiration* seems clearly referable to the condition of the heart, for the patient is in a very different condition from that of ordinary congestion;—a sense of weight and pain is felt more particularly in the region of the heart, and though he often declares he cannot breathe freely, yet he is able to maintain the recumbent posture

The *smell* of a Cholera patient is so peculiar, that the disease may be sometimes recognised before the patient is seen; but it is not yet ascertained on what this smell depends.

Coma usually precedes the death of the patient;—adults rarely recover when this condition has super-

vened, but with children this symptom has readily disappeared on the application of leeches.

To the *morbid appearances* which the heart presents, we believe sufficient attention is not generally paid: we have invariably found its texture flabby, compared with that of the muscular structure in other situations, which has been unusually firm.

Of the altered condition of the mucous membrane of the alimentary canal, it may be remarked that this affection is not inflammation, as has been supposed by some writers: all our previous knowledge of this action is at variance with the phenomena presented in Cholera. Majendie has demonstrated by an ingenious experiment the difference between real inflammation and the congestion in this disease; he found that the colouring matter could be easily forced out of the vessels by injection in portions of membrane apparently inflamed in subjects which had died of Cholera: while on the contrary this could never be effected in portions of membrane taken from those who died of inflammation. Congestion and secretion would appear to be the real conditions of this organ in Cholera; and with respect to the pink appearance often observed, it is not surprising that some of the colouring matter should at length appear not only in the membrane itself, but also in the secretion, since, in inveterate cases, little else than this material is left in the blood-vessels, nor is it, indeed, very uncommon

for some of the last evacuations to consist of pink fluid.

The mucous follicles are sometimes enlarged, and mucus has been then observed abundant; while in other cases they have been normal, and the mucus has not been remarkable. The mucous follicles are not therefore inferred to be active agents in this disease.

If the disease do not terminate in death, it may be considered at an end when the peculiar discharges cease; for the phenomena which follow are to be considered as necessary operations for the establishment of reaction, or as accidents, which though induced by the disease, are yet not necessarily connected with it.

The diarrhœa has now altogether subsided, and the bowels remain perfectly tranquil, for an indefinite length of time: not so the stomach, the vomiting continues, by its action driving forward the blood through the congested vessels: the gall-duct too, now permits the flow of the bile, which is generally in a vitiated state, and thus continues the action of vomiting till the circulation becomes re-established: a further flow of bile then gradually prepares the alimentary canal for a renewal of its proper function.

During all this time, the inordinate thirst, so cha-

racteristic of the disease, continues; * a thirst which induces the patient to drink many gallons of water and thus the process of reaction is materially assisted by absorption of water into the blood-vessels, as well as by nausea and vomiting as will hereafter be more fully adverted to.

The urine does not generally become secreted till from forty to sixty hours after the commencement of the Choleric attack; and it is often delayed for a longer period than this,—four or even five days sometimes elapsing before this secretion is re-established.

The symptoms of Cholera, like the symptoms of other diseases, assume every grade of intensity, and it is in proportion to the severity of the attack that the dangerous effects of the sequelæ are experienced.

These still consist in disordered circulation—local congestions and inflammations are liable to occur in one viscus or another, and the brain, stomach, kidney, liver, spleen and lungs are occasionally attacked with inflammation, and they are here enumerated with some regard to the relative frequency with which they are liable to be attacked.

It sometimes happens that a patient in whom the collapse has been severe, undergoes an imperfect re-

* The quantity of water said to be taken by a patient in the Greville Street Hospital, amounted to ninety gallons.

action, in which state he may continue from the seventh to the fourteenth day. The extremities in these cases continue cold ; the pulse extremely feeble ; appetite does not return ; pain is not always felt, but a most distressing restlessness is experienced, and the patient continues perfectly sensible till within a few hours of death.

In these cases no remarkable lesion can be discovered, except of the heart. The parietes of this organ are flabby, while the muscles are firm, and some of the cavities, often the left ventricle, are considerably dilated, the parietes being exceedingly thin.

We have attempted to shew, that the brain is still capable of watching over the system in this altered condition ;—that the suspended secretions form a part of the salutary process ;—that the affection of the respiration has reference merely to the condition of the heart. We have ventured to assume that the sensation of heat which is felt throughout the body by the patient, but more particularly in the epigastric region, depends on the nervous energy being engaged in that process, by which the system is so remarkably drained of its fluids ; and we have endeavoured to prove that the heart itself is the organ primarily, and most essentially affected.

We trust some further elucidation of the subject will accrue in the consideration of the

TREATMENT OF CHOLERA.

If the foregoing arguments have satisfactorily established the position that the disease is produced by a poison, then it is certain that the highest ground on which to conduct the treatment is to administer an antidote.

Now antidotes may be considered as of two kinds.

1st. **CHEMICAL.**—Those which alter the nature of poisons and render them harmless.

2nd. **PHYSIOLOGICAL.**—Those which remedy the morbid effects produced by poisons.

It would appear that the word antidote when applied in any other sense than to express a substance capable of changing the chemical nature of a poison, should either be used to signify all appropriate remedial measures taken together, or that its use should be entirely abolished.

Christison, after speaking of the nature of chemical antidotes, says, “the other kind of antidote operates not by altering the form of the poison, but by exciting in the system an action contrary to that established by the poison. On considering attentively,

however, the phenomena of the action of individual poisons, it will be found exceedingly difficult to say what is the essence of a contrary action, and still more, how that action is to be brought about. Accordingly, few antidotes of the kind, are known. Physiology, or experience, has not yet brought to light any mode of inducing an action counter to that caused by arsenic, and most of the irritant class of poisons. It appears probable that the remote operation of lead may be sometimes corrected by mercury given to salivation, and that the violent salivation caused by mercury may be occasionally corrected by nauseating doses of antimony. But these are the only instances which occur to me at present of antidotes for irritant poisoning, which operate by counter action, *unless we choose to designate by the name of antidote the conjunction of remedial means which constitute the antiphlogistic method of cure.* In the class of narcotics we are acquainted with equally few constitutional antidotes, although the nature of the action of these poisons seem better to admit of them. Ammonia is to a certain extent, an antidote for hydrocyanic acid, but by no means so powerful as some persons believe; and I am not sure that in this class of poisons we can with any propriety mention another antidote of the constitutional kind."

The advantages of adopting the term *physiological* are these. 1st. That of drawing more widely the dis-

inction between the two kinds of antidotes. 2ndly Divesting the second kind of antidote of undue influence on our minds; since we see on Christison's authority, that those antidotes which do not change the chemical nature of poisons, possess no greater effect as remedies (though the best we have) than the principles of therapeutics would teach us to expect; and that therefore all therapeutical means, having the same beneficial tendency, are equally entitled to the name of antidotes.

Nature has yet to be explored for that great desideratum, a chemical antidote for Cholera; no analogous discovery has even as yet been made, unless we admit the antidote of vaccination to the small-pox, the discovery of which, was as little likely to be accomplished *a priori*, as that of an antidote for Cholera; but if we cannot alter the nature of the poison, and therefore prevent its deleterious effects, it is the more necessary that we enquire into the most appropriate physiological means for remedying the effects when they are produced.

We must here revert to what has already been advanced, viz, that the poison of Cholera has a direct tendency to paralyse the heart, and that in order to avert the immediately fatal effect of such an operation, the physiological condition of the patient becomes altered: the blood becomes diminished in quantity, and altered in quality; one measure being thus

adopted by what has been called the *vis medicatrix naturæ* for the recovery of the patient, analogous to the beneficial eruption of small-pox, or to the reparative process after mechanical injury. If this position have been established, then the patient may be considered as under the influence of an antidote of the physiological kind so soon as the Choleric discharges commence.

The questions now arise—Is this the best physiological condition under which the patient can be placed? If it be, can art assist in establishing this condition, or in regulating it?

The first question may at once be answered in the affirmative, by saying it is the work of nature; but to state the arguments more fully it may be said:—

1st.—That the extreme probability of the utility of the Choleric discharges has been already shewn.

2ndly.—That though the altered condition of the blood is certainly compatible with life, while the heart is quiescent, yet it is not equally certain that it is in a fit state for usual circulation.

3rdly.—That such remedies as would appear to afford the prospect of antidotes to the lesion of the circulation (viz. that of exciting a contrary action) have been extensively employed in the whole class of

stimulants, and have been attended, not merely without success, but with mischievous effects.

4thly.—That there is no reason to believe that any remedies have been serviceable in this disease, which do not admit of explanation on the view here taken of its nature.

If it be necessary that the blood should be diminished in quantity and altered in quality, in order to afford tranquillity to the heart, then it is obvious that stimulants, increasing its irritability, would prove injurious, and general experience has proved them to be so.

Even those writers who most strenuously recommend stimulants, do so from a prejudiced idea that they are indicated by the symptoms, rather than from any actual experience of their utility. Orton recommends stimulants, as strongly “indicated” in this disease; but adds, “in the use of these medicines the principal danger appears to be that of the practitioner *doing too much*.” Bell, when speaking of these remedies, declares “the general *mistake* in the treatment, has been the administration of too large doses of those medicines which have obtained a high character among practitioners.” We here at least see how cautiously stimulants are practically recommended, however strongly they appeared to be indicated to the minds of these practitioners; though we

have already referred to the boldness with which these very authors recommended bleeding, a remedy of just an opposite tendency to stimulants.

Sir W. Crichton, in a letter addressed to Sir Alexander Crichton, gives an account of the various modes of treatment adopted in St. Petersburg by the German physicians. The modes of treatment found most successful were those of Dr. Lemaire and of Dr. Lerche. Dr. Lemaire's treatment consisted in cupping in the region of the præcordia, or moderate bleeding, tartar emetic, and diluents of barley water or milk. Dr. Lerche's plan consisted in small bleeding, or leeches to the præcordia, emetic of ipecacuanha, or tartar emetic in soda water, and camphor given in homœopathic doses. These modes of treatment are contrasted with others in which internal and external stimulants were chiefly employed.

The stimulating plan of treatment recommended by Drs. Russell and Barry, is not supported even by the official reports which constituted the data on which their recommendation was founded, for it is only when stimuli either formed a secondary consideration, or were abandoned altogether, that any remarkable degree of success is recorded, as the following quotations will tend to show.

“The strongest stimulants and bleeding were used in a disease of a few hours' duration, according to the

instinctive view of the symptoms presented to each practitioner. A milder practice was adopted by others, of giving magnesia in milk to the amount of a drachm or more every half-hour or hour, with the intention of pacifying the vomiting and acting on the bowels by gentle means. *Some considerable success*, which attended the practice, induced for a time, a frequent repetition of it, but the subsequent failure of these means leaves on the face of the report a *doubtful* opinion of their efficacy.

“But the remedy which is described, as being most uniformly successful (when it could be used) is bleeding, and this even in cases when the pulse was scarcely perceptible at the wrist.”

The oxide of bismuth is also highly spoken of as a remedy. Stimulants were indeed used in conjunction with this, but at the same time “plain water ad libitum; but in small quantities at a time, at the temperature of the atmosphere” was allowed.

“Dr. Bloom (chief physician to the Merchants’ Cholera Hospital) informed us that he had just been at a numerous meeting of hospital physicians, at which there was a great diversity of opinion as to the best method of treating Cholera, but that the *magisterium bismuthi* had by far the largest number of suffrages: the greater number had found warm and vapour baths hurtful rather than otherwise; some assert-

ed that bleeding and emetics almost invariably saved the patient."

"Two German physicians, Ysenbech and Brailow, stated publicly and firmly, yesterday, in my presence, at the medical council, that during the preceding eleven days they had treated, at the Custom House Hospital, thirty Cholera patients, *of whom they had not lost one*. They gave two table-spoonsful of common salt in six ounces of hot water at once; and one table spoonful of a similar mixture, cold, every hour afterwards. They always begin by bleeding.

"But in the ordinary way of treating the disease, suppose the first stage safely past, very rarely indeed, not five times in the hundred, does the patient return to health without passing through a dangerous fever, &c."

Mr. Searle affords a remarkable example of the delusion which prejudice exerts on the mind. He was himself affected with Cholera. The treatment of his own case consisted almost exclusively in drinking cold water very frequently, yet, being convinced that stimulants are *indicated*, he recommends to others, strong brandy and water—one part spirit to two of hot water.*

The valuable paper of Mr. J. Freeland Fergus, in-

* Searle on Cholera.

forms us of what happened at Vienna, with respect to the treatment of Cholera.

“The effect of the treatment employed during the Cholera itself was very striking. When ice was used, the reaction was always very violent, and the congestions to particular organs very strong; but these were of an active character, and therefore more under the control of the physician. The indiscriminate employment of strong stimulants in large doses, as opium, camphor, musk, ether, oil of cajeput, especially in the active forms of Cholera, was followed so constantly by a dangerous and soporose state, that after some time they were almost entirely neglected by all the physicians of Vienna.”

Extract from Mr. Fergus’ tables, relative to the Cholera at Vienna.

Treated with ice from Sept. 15, till the end of Oct.	} Cases 100	Cured 65	Died 35
Ditto from end of Oct. till 12th Dec.	42	34	8
Ditto stimulants and hot frictions.....	292	128	164
Ditto ipecacuanha alone	21	9	12
Ditto ipecacuanha and stimulants....	37	12	25
Ditto ice and stimulants	48	19	29

“Here then,” says Mr. Fergus, “stand on the one side, bleeding, emetics, ice and sinapisms; and on the other, opium, brandy, camphor, oil of cajeput, sulphuric ether, hot frictions, baths, &c. These last were at the commencement of the epidemic, almost unanimously employed.

“But in so far as the former were found more effectually to stop the course of the disease, to produce reaction, and to give an active character to those congestions which afterwards developed themselves, the use of the latter was almost unanimously abandoned by the physicians of Vienna, except in those cases of exhausting diarrhœa, described as the third form of Cholera (occurring in scrofulous or debilitated habits of body) for though they sometimes put a stop to the symptoms of the disease, and even raised the patients out of those desperate states of congestion or paralysis in one or two cases, yet their use was always followed by the sopor and the worst forms of typhoid fever. Even in the third form they were given only in small doses, never in such quantity as was necessary to produce reaction in the first and second forms.”

Having endeavoured to show that the use of *stimulants* is neither warranted by experience, nor by the reason of the thing, let us next inquire into the remedial virtues of

CALOMEL.

This medicine has been used at all times since the disease has been known, and has held a prominent station in materia medica, as a remedy for Cholera. Calomel has been exhibited in large doses, as a scru-

ple or half a drachm every hour, or in small doses, as a grain, repeated at very frequent intervals.

Two peculiar effects are known to result from the use of calomel, viz, stimulation of the secreting organs, and stimulation of the absorbents.

As secretion and absorption have generally been assumed to be annihilated in Cholera, this remedy would appear at once to afford an antidote, operating by counter-action, as Christison expresses it.

It has, however, already been hinted, that so far from secretion being annihilated, this process is carried on to an unexampled extent in the form of the Choleric discharge, *superseding*, indeed, *some* of the natural secretions, but the undeniable fact that milk is secreted during the existence of acute Cholera, is a proof that secretion is not essentially suppressed. As to absorption, the attenuated condition of the patient, shows that the lymphatic system has been actively employed, but we have endeavoured to show that the object of nature being to reduce the bulk of the blood, and alter its quality, assimilation is not (during the entire progress of the disorder) probably either a possible or a desirable process. If then it be not tenable that calomel is an antidote operating by counter-action, what pretensions does experience affirm it to possess as a remedy founded on the general principles of therapeutics?

The pathological view, indeed, on which calomel has been generally given, is to reproduce the so much desired appearance of bile in the evacuations; and Dr. Joseph Ayre who has, perhaps, of all writers, the most strongly insisted on the efficacy of this medicine, thus states his opinion of the nature of the disease "that the seat of the disorder is in the liver, and the means suited to the disordered actions of this organ are adequate to restore the other disturbed functions to their healthy condition."

If our view of the nature of the disease be admitted, then so far from the liver being the seat of the disorder, it is not necessarily disordered at all, and though, generally (for it is not universally the case) the secretion of bile becomes disordered in this disease, this is an occurrence which obtains in almost all constitutional diseases, which are universally admitted not to have their origin in the liver, and is therefore no argument against us. As to the temporary suppression of the secretion, we do not admit that to be proof even of disorder, for reasons before stated.

Now all that is known of the effects of calomel can be explained only on the principle of absorption, but as Dr. Ayre himself admits that "pending the collapse, no absorption of this medicine will take place;" let us, for the sake of argument, refer its action immediately to the nervous tissue. We shall, even in this case be constrained to admit, that though this

substance may be capable of affecting the nervous tissue in another state, yet in this disease, it is altogether inert; for experience has established the fact, that whether given in large or small doses, or omitted altogether, exactly the same phenomena hold their course without any modification whatever. But if calomel cannot be serviceable in the state of collapse, it next becomes a question whether it can be serviceable in the state of reaction.

In this condition we do not perceive any argument against its possible utility; stimulation of the secreting organs and of the absorbents, if this action be exerted, cannot be objectionable, and, indeed, he who has witnessed the states of inflammation which sometimes follow reaction, together with a peculiarly altered and viscid condition of the blood, which often attends a comatose condition of the brain at this period, would not fail to recognise in calomel a valuable remedy for anticipating and preventing these conditions from its known antiphlogistic and attenuating properties.

It is unnecessary to analyse the alleged virtues of the numberless remedies which have been recommended for this disease; it is sufficient to remark that they owe their reputation either to their inertness, or to the mode in which they were administered. Of the former, the oxide of bismuth and magnesia may perhaps be fairly mentioned; of the latter, nitrous acid

and potash may afford examples. Nitrous acid was recommended by Mr. Annesley, with the view of oxygenating the system. His mode was to give it largely diluted with water, probably to induce the patient to use it freely; it was also used in the form of bath. We here see at once a source of fallacy, for the question lies between nitrous acid and water. Accordingly as soon as this medicine became the subject of more exact experiment in the hands of others, it soon fell into disrepute, though in the hands of Mr. Annesley, it was attended with considerable success. Exactly the same explanation applies to the potash. The recommendation of this alkali originated from the circumstance of a Cholera patient, a soldier, having slaked his thirst with some dirty water in which wood ashes abounded; for a sentinel had been placed at the door of the camp hospital, with strict orders to prevent the ingress of water, so loudly was it called for by the patients, and so injurious was it considered by the medical attendants: accordingly, this man having most unexpectedly done well, and the quantity of the fluid which he had taken being too considerable to be supposed unconnected with his recovery,—the credit was awarded to the potash, which maintained its reputation for a time, but lost it, exactly in proportion as it became administered in such a manner as accurately to determine its virtues. As then it has been shewn that the best physiological state for a patient under the influence of the poison

of Cholera is, that he should be affected with the Choleric discharge, we next have to consider if art can assist in establishing or in regulating this process.

Now here, in order to give a clearer view of our meaning, let us have recourse to analogy. In small-pox, for example, though we generally have the eruption appearing when our attention is called to the patient; yet we sometimes witness its attacks in another form: the most violent phrenitis, occurring suddenly, is presented to our view;—the patient is in this state bled freely, and cold is applied to the head, and then the phrenitic symptoms being moderated, the eruption, previously altogether suppressed, makes its appearance, and the disease now takes its usual course in the mitigated form.

But it is not inferred that because a bleeding under such circumstances is beneficial, that bleeding in all cases of small-pox is proper. In the generality of cases of this disease, all that is requisite to be attended to in the treatment, is to supply the most harmless and refreshing drink to quench the patient's thirst, and so to regulate the temperature of his apartment that nervous excitement may be moderated. If more than this be necessary, it is because some accident is complicated with the disease, which requires to be remedied on the general principles of therapeutics.

So in Cholera, undoubtedly bleeding has been of

the greatest advantage in some cases, appearing even nearly to have superseded the Choleric discharge, and thus to have cut short the disease, but experience has established the fact that its effects are injurious, if used indiscriminately. We believe that the abstraction of blood either by venesection, or by leeches applied to the epigastric region, is sometimes useful in relieving the congestion consequent on so new and sudden a process as the secretion of the Choleric fluid, thus enabling that process to proceed more favourably. But in the more intense forms of Cholera, it is well known, that the abstraction of blood is impossible by any means; it will not flow from an open vein, nor can it be abstracted by leeches. In this state there is a sensation of extreme heat felt throughout the body by the patient, though the surface is marble cold to the touch of another; a distressing restlessness is experienced, and an intolerance of the lightest clothing is manifested. It is now that the use of ice is demanded, and its beneficial effect is fully established by experience. It is a well-known property of cold to diminish nervous sensibility: the vascular system is here in a state of intense congestion, and its function is for the present destroyed; and the nervous system is in a state of excitement threatening exhaustion: if relief cannot be administered directly and mechanically to the circulation by abstracting blood from the vessels, the next best thing is to afford it through the medium of the nervous

tissue: and thus, excitement being diminished by the use of ice, the process of secretion is established, and the congestion is relieved.

Here then are two means which art possesses for assisting in establishing and regulating the Choleric process; the abstraction of blood; and in still severer cases—the use of cold.

When the secretion is effected, it passes away from the system, either by the bowels alone, or is ejected also directly from the stomach by vomiting.

It has been observed by writers that when in epidemic Cholera, vomiting formed the prominent symptom, and the diarrhoea was trifling, the disease was seldom fatal.

In such cases, indeed, the disease would appear to be essentially milder for these reasons:—1st. because a smaller portion of the alimentary canal is required by the necessity of the system to be subjected to the process of elimination; and 2ndly, that the nervous energy of the stomach is not so intensely engaged in this process as to be rendered incapable of the action of vomiting. The advantage of the vomiting itself is considerable, as directly tending to restore the heart's functions by mechanically assisting in driving forward the blood in the congested vessels.

As vomiting is so serviceable, the value of emetics

becomes a question. It should be recollected that vomiting forms so general a symptom of the disease, that the probable cause of its absence must be first considered, before recourse is had to emetics. If the patient be extremely collapsed, it may be necessary that the nervous energy of the stomach should be so intensely engaged in the process of elimination, as to render the action of vomiting impossible; for if the nervous energy of the stomach were at all diverted from this process, then death might immediately result from the condition of the organs of circulation, which the stomach had been assisting in relieving. Whether this be a satisfactory explanation or not, experience has established the fact that powerful emetics not only often fail altogether to act under these circumstances, but they appear to be connected with the fatal result which often speedily follows their exhibition.

There is, however, one condition of the system in which emetics seem peculiarly serviceable. It has been already said that the respiration is not essentially impaired, but that its abnormal condition merely results from the condition of the circulation: but it sometimes happens that a true dyspnœa supervenes suddenly, the *alœæ nasi* become flapping, and pain and distress is experienced in the chest,—here we have witnessed the happiest effects result from the exhibition of emetics. When, however, vomiting is

spontaneous, it appears to be always beneficial; nor does it appear to be less so, when it is encouraged by the copious draughts of fluid with which the patient is induced to slake his urgent thirst.

There is, however, another class of remedies, which should engage our attention in the consideration of

SALINE MEDICINES.

Organic chemistry is at present so little understood, that it is not from this science we can venture to draw inferences in favour of the use of saline remedies. Experience, however, teaches us that saline substances introduced into the system, are quickly passed off by one excretory or another; and it is well known that certain of these salts have a specific effect on each of these organs. It is not unreasonable to suppose that the kidneys, not called into action for so long a time, should require stimulation, as the stomach often requires a stimulant after long fasting before its function is readily resumed: for this purpose the neutral salts, known to affect the kidney, afford an unobjectionable diuretic.

The muriate of soda abounds so largely in nature, that the fact of itself is a strong presumption of its use in the animal economy. Man uses it with advantage, and its excellent effects are well known to graziers and others interested in the health and condition of the

lower animals. It is uniformly found in healthy serum: in the serum of Cholera blood, it is said by those who have analysed this fluid, to be deficient in quantity. If taken into the stomach in large quantities, this salt excites vomiting, but in smaller, it enters the circulation—occasions thirst, and either directly or indirectly stimulates the excretories.

There do not appear to be any disadvantages, at the least, to be apprehended from the use of these substances; and the profession is much indebted to Dr. Stevens, for having been highly instrumental in substituting a harmless and probably beneficial class of remedies in the place of medicines of a most injurious and fatal tendency. The theory, indeed, on which Dr. Stevens supports the saline treatment is not admissible; but as we can only repeat the objections which have been raised by those who have already refuted his opinions, we think it unnecessary to enter into the subject.

Thus, as far as the disease itself is concerned, our remedial means are extremely limited, but our minutest attention is required to watch and remedy the effect of accidents, which the disorder may occasion.

In order to illustrate our view of the nature of the disease, we will briefly detail the history of a few cases.

A man, aged twenty-two, was found by the police about nine in the evening, (Sept. 21st, 1834) lying down on the step of a door-way with a quantity of fluid proceeding from his person. He described himself as a stable-man, and said he was at some distance from his lodging, whither he wished to proceed, that he had been troubled with a bowel complaint all day, but that now it had become so bad that he could no longer restrain the evacuation, and becoming faint, he had been compelled to lie down. He was also affected with cramps in the extremities. The policemen carried him to St. James's Infirmary. Being informed of these particulars while in attendance on a patient, we directed that he should keep the recumbent posture, and if thirsty, should be supplied with spring water *ad libitum* till our arrival. Accordingly, in a short time we found him drinking pint after pint of water out of a publican's pewter pot, not less to his own astonishment than to that of the bystanders, for he declared he was not addicted to water drinking.

His appearance was much collapsed, eyes deeply sunk, fingers corrugated, skin cold, pulse extremely feeble but not imperceptible. He had not vomited till he commenced drinking the water, since which, however, this symptom had frequently occurred, but it was remarked by those about him that he had not ejected nearly so much fluid as he had taken. He

was now removed to the Cholera ward, placed in bed and soon afterwards feeling chilly, warm bottles were applied to his feet, after which there was one slight evacuation from the bowels, presenting the colourless Choleric appearance. He continued drinking water very frequently during the night, and vomiting a fluid at first clear, afterwards tinged with yellow bile. At 10 a.m. the following morning, he expressed himself as feeling quite recovered.

The pulse having acquired considerable fulness, he was now bled to ten ounces, took some mutton broth in the afternoon, slept well the succeeding night; on the following morning being quite restored, he returned to his home.

CASE 2.—A woman, aged forty, residing in Ham Yard, Windmill Street, had been in close attendance for three days, on her husband, who was affected with Cholera. On the morning of the fourth, (Aug. 18th, 1834) after the commencement of her husband's attack, she became violently affected with the disease. She took nothing but water during the day, having observed its beneficial effect in her husband's case, but towards evening she became intensely collapsed, and so altered in appearance, that those who were intimate with her could not recognize her. There was now no thirst, no power of speech; and though the mind continued sensible there was extreme indifference to every thing,

and altogether a state nearly approaching asphyxia. We induced her to drink a small quantity of a solution of culinary salt; but drinking being attended with painful effort, but little was swallowed. We directed that she should be kept perfectly tranquil, and any inclination she might evince for drink, carefully watched and attended to. The window was kept wide open, and the covering on her person was extremely light. On leaving the patient, we explained that, if any change for the better took place, it would be manifested by vomiting. Three hours afterwards, vomiting took place, the thirst returned, she was supplied with drink from the spout of a tea-pot, and a bason so placed at the bed-side to receive the egesta, as that the recumbent posture was strictly preserved. The vomiting continued three days. Some slight pain in the head gave occasion for a moderate bleeding and the application of leeches;—the woman ultimately perfectly recovered.

CASE 3.—A child, five years of age, residing in the same house, became collapsed (Aug. 18th) after several hours purging. He had been imploring for cold water during his illness, which the prejudice of the mother refused. It was, however, now given at our suggestion, and was taken with such astonishing avidity, that the mother instinctively endeavoured to restrain the gratification of the child's thirst. The following morning, we found him in a state of insensi-

bility ; leeches were applied to the forehead, and with such immediate relief, that the child got out of bed shortly after their application, and insisted on having breakfast ; having taken some solid food the symptoms of Cholera returned,—a state of collapse again took place, reaction again followed, being assisted by copious draughts of water ; but congestion of the brain, and fever of a severe character followed this attack, from which the child recovered eventually, requiring the frequent application of leeches to the head, and taking calomel and saline medicines.

The mode in which *nature* effects the process of reaction is this. 1st. By the absorption of water into the blood-vessels.

2nd. By nausea,—which produces general relaxation of the system ; thus diminishing obstruction to the passage of the blood in the vessels.

3rd. By retching, or vomiting,—which mechanically assists in driving forward the blood in the congested vessels.

As to the accidents which so commonly arise out of an attack of Cholera, they consist in local congestions, or inflammation of some internal organ ; the most appropriate treatment for which affections is so universally admitted, that it would be superfluous here to enter minutely on the subject, merely observing

that the prompt and repeated abstraction of blood in these cases is more necessary, than in any other circumstances where inflammation occurs; so rapid is its progress, and so fatal is the result.

We do not know of any remedy for that condition in which, as we have before said, the patient lingers, for a period of about seven, or even as long as fourteen days, with feeble pulse, cold extremities, &c. and the cause of which we have referred to organic lesion of the heart.

FINIS.





